UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/617,068	07/10/2003	Yeong-Taeg Kim	SAM2.PAU.20	3772

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ART UNIT	PAPER NUMBER
2628	

DATE MAILED: 10/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *7/10/06*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *22-39* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *22-30, 32, 33, 36 and 39* is/are rejected.

7)☒ Claim(s) *31, 34, 35, 37 and 38* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1.   This action is responsive to communications: Amendment, filed on 7/10/06.

2.   Claims 22-39 are pending in the case. Claims 22 and 39 are independent

claims. Claims 22, 23 and 26-30 have been amended. Claims 31-39 are newly added.

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

1.   Claims 22-30, 31, 32, 33, 36, 39 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Kusakabe et al, US 2005/0031223 A1, 2/2005.

As per independent claim 22, Kusakabe discloses a noise detector (Fig. 1 "104") that

detects areas of noise in a pixel window based on the pixel information (i.e. evaluating

pixel values to detect visibility of blur regions) (pp. 6, Para 89-93; pp. 7, Para 107), the

pixel window including a set of pixels from the input image pixels (pp. 2, Para 16; Fig.

6B); an image processor (pp. 2, Para 15) that processes window pixels to generate

pixels with reduced noise (Fig. 11); and a combiner (i.e. output means) (pp. 2, Para 15)

that selects the processed pixels with reduced noise in the detected noise areas, and

generates an output image comprising; (i) the selected processed pixels with reduced

noise, and (ii) the remaining window pixels from the input image (i.e. "noisy" pixels are

given substitute values based on a process to reduce noise; and the output image is a

combination of the non-noise pixels and the substituted pixel values with noise

suppressed) (pp. 7, Para 113; pp. 8, Para 122-124; Fig. 11); whereby the output image

includes portions of the input image where noise artifacts were not detected (i.e. image

includes non noise region pixels 601) (Para 113; Fig. 11A), and portions of the

processed image corresponding to areas in the input image where noise artifacts were

detected (i.e. image includes noise region pixels 600) (Para 113; Fig. 11A), such that

the output image is an enhanced version of the input image (p. 1, Para 14; p. 8, Para

132, Fig. 1A "104") with noise artifacts substantially reduced (p. 4, Para 61).

Kusakabe fails to disclose ringing artifacts.

It would have been obvious to one of skill in the art to include ringing artifacts

with the method of Kusakabe because Kusakabe teaches evaluating pixel values to

detect visibility of blur regions, where blur regions are example of image deterioration or

ringing artifacts due to encoding or decoding of an image.

One of skill in the art would have been motivated to include ringing artifacts with

the method of Kusakabe for the benefit of reducing deterioration of image information.

As per dependent claim 23, Kusakabe discloses the ringing-artifact detector comprises

a pattern detection function that detects ringing pattern-like features (p. 5, Para 85)

indicating the areas of ringing in the pixel window as a function of gradation level

difference between one or more pixels therein (i.e. a luminance/gradation difference

between pixels is used as a parameter for determining noise) (pp. 7, Para 109; pp. 8,

Para 127; Fig. 13).

As per dependent claim 24, Kusakabe discloses the ringing artifact detector determines

the color difference between a pixel and that of neighboring pixels (pp. 9, Para 137),

and detects if the color difference is within a selected threshold, indicating ringing-like

artifacts proximate that pixel position in the window (pp. 11, Para 169).

Kusakabe fails to disclose determining gradation level difference.

It would have been obvious to one of skill in the art to include determining

gradation level difference with the method of Kusakabe because Kusakabe teaches the

image information compared may alternatively to luminance and color difference

components.

One of skill in the art would have been motivated to include determining

gradation level difference for the benefit of processing image information including

gradation level components.

As per dependent claim 25, Kusakabe disclose the image processor included a low

pass filter that reduces ringing artifacts (pp. 1, Para 8; pp. 8, Para 132).

As per dependent claim 26, Kusakabe discloses the image processor includes a

smoother (i.e. LPF) that reduces ringing artifacts (pp. 1, Para 14; pp. 4, Para 61; Fig. 1A

"104").

As per dependent claim 27, Kusakabe discloses a variance detector that determines

local variance of each pixel in the window with respect to pixels (pp. 7, Para 107-109),

wherein the local variances indicate presence of noisy areas in the image (p. 5, Para

87); a signal detector that based on the local variances, detects if the location of the

window is proximate a noisy area in the input image (i.e. the threshold values of the

luminance parameters are used to detect noise/signal when comparing pixels within a

window; such that the window size is adjusted during the noise suppression process to

sufficiently reduce noise) (pp. 7, Para 114; pp. 8, Para 120); such that the combiner

further selects pixels with reduced ringing artifacts from the processed pixel (pp. 8, Para

122-124), based on the detected ringing artifact areas and the detected window location

information (pp. 2, Para 16), and generates that enhanced output image comprising; (i)

the selected pixels with reduced ringing artifacts (i.e. noise removal process visually

reduces noise) (p. 4, Para 61), and (ii) the remaining window pixels from the input

image (pp. 7, Para 113; Fig. 11A).

Kusakabe fails to disclose determining a variance to neighboring pixels.

It would have been obvious to one of skill in the art to include determining the

variance between neighboring pixels with the method of Kusakabe because Kusakabe

teaches evaluating a pixel of interest and an arbitrary pixel, where an arbitrary pixel within the same image is a neighboring pixel.

One of skill in the art would have been motivated to include determining the variance between neighboring pixels with the method of Kusakabe for the benefit of determining the difference between pixels to aid in the suppression of noise/image deterioration between pixels.

As per dependent claim 28, Kusakabe disclose the combiner pixels with reduced ringing artifacts from the processed pixels in the detected ringing artifact areas, based on the window location information (pp. 8, Para 122-124).

As per dependent claim 29, Kusakabe discloses the combiner selects pixels with reduced ringing artifacts form the processed pixels in the detected ringing artifact areas, corresponding to substantially in noisy input image locations (pp. 8, Para 122-124).

As per dependent claim 30, Kusakabe discloses the input image comprises a decompressed image (i.e. input image having an enlargement ratio corresponds to a decompressed image) (pp. 12, Para 182), such that said ringing artifacts were generated by image compression and/or decompression (i.e. deterioration results from encoding process for JPEG, e.g. compression of digital image) (p. 5, Para 5).

As per dependent claim 31, discloses the larger the gradation level differences between a pixel and its neighboring pixels, then the lower the ringing artifact effect.

As per dependent claim 32, discloses the variance detector determines the local deviation in the image (pp. 7, Para 107-109).

As per dependent claim 33, the rationale as applied in the rejection of claim 27 applies herein.

As per dependent claim 36, Kusakabe discloses a pattern detection function that detects ringing pattern-like features in the window (p. 5, Para 85). The rationale as applied in the rejection of claims 22 and 27 apply herein.

As per independent claim 39, Kusakabe discloses a device (Fig. 1 & 3) for implementing the method of claim 22. The rationale as applied in the rejection of claims 27 and 36 apply herein.

2.   Claims 31, 34, 35, 37 and 38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

3.   Applicant's arguments filed 7/10/06 have been fully considered but they are not

persuasive.

As per claim 22 Applicant argues Kusakabe does not perform any ringing-artifact

detection...

In response, it is the interpretation of the Examiner that Kusakabe performs

ringing artifact detection as he discloses evaluating pixel values to detect visibility of blur

regions, which are areas of ringing artifacts (pp. 6, Para 89-93). It is well known in the

art that blur regions in a compressed/decompressed image correspond to ringing

artifacts. Therefore, Kusakabe teaches performing ringing artifact detection.

Applicant argues (pp. 15) Kusakabe does not disclose an image processor... to

generate pixels with reduced ringing artifacts.

In response, it is the interpretation of the Examiner that Kusakabe's disclosure of

an image processing apparatus for processing and outputting image data after noise

removal (pp. 2, Para 15), where noise removal suppresses/reduces deterioration of

image information (p. 1, Para 14) corresponds to an image processor to generate pixels

with reduced ringing artifacts.

Applicant argues Kusakabe does not disclose the combiner.

In response, Kusakabe discloses identifying pixels belonging to both a noise and

a non-noise region; and combining pixels of both regions to obtain a noise removal

effect. Therefore, Kusakabae discloses a combiner. Applicant additionally argues

substitution of a pixel of interest is not the same as reducing ringing artifact of a pixel of

interest. However, Applicant fails to specifically claim how to reduce ringing artifacts.

Applicant argues Kusakabe fails to disclose the features of claim 23 as Kusakabe does

not disclose gradation levels or determining areas of ringing based on gradation levels.

In response, Kusakabe discloses a luminance/gradation difference between

pixels is used as a parameter for determining noise (pp. 7, Para 109; pp. 8, Para 127;

Fig. 13). Kusakabe teaches noise or image deterioration is a result of ringing (p. 1,

Para 5. Therefore, it is the interpretation of the Examiner that Kusakabe discloses the

features of claim 23.

Applicant argues with respect to claim 24, Kusakabe does not disclose gradation level

difference.

In response, Kusakabe discloses determining the difference between color

components, which may alternatively be luminance and color difference components. It

is the interpretation of the Examiner that it is obvious to include gradation level

difference with the method of Kusakabe because luminance and color difference

components are an alternative form of image data that can be processed to determine

ringing/noise artifacts.

As per dependent claim 25, Applicant argues Kusakabe does not disclose applying LPF to the original image to generate pixels with reduced ringing artifacts...

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., applying LPF to the original image to generate pixels with reduced ringing artifacts) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

As per dependent claim 26, Applicant argues Kusakabe does not disclose the image processor includes a smoother.

In response, Kusakabe discloses an image processing apparatus for performing a noise removal process based on an LPF, e.g. smoother. Therefore, Kusakabe discloses a smoother for reducing ringing, e.g. noise/image deterioration.

As per dependent claim 27, Applicant argues Kusakabe does not disclose a local variance... and a signal detector...

In response, it is the interpretation of the Examiner that Kusakabe discloses a local variance detector as he teaches determining whether or not the values of compared pixels exceed a threshold, where the comparison result determines whether or not to apply a noise removal process (pp, 7, Para 107). Additionally, it is the interpretation of the Examiner that Kusakabe discloses a signal detector.... as he

teaches the window characteristics affecting the noise region that needs to be processed for noise removal. The rationale as applied in the response to claim 22 applies herein.

As per dependent claim 28, Applicant argues Kusakabe does not disclose that the combiner selects pixels.... based on the window location.

In response, Kusakabe teaches combining selected pixels dependent upon the size of the window, such that the window area affects the shape of the image region (p. 8, Para 122-125; pp. 7, Para 113-115). Therefore, Kusakabe discloses the combiner selects pixels.... based on the window location.

As per dependent claim 29, Kusakabe does not dislcsoe the features of claim of 29.

In response, based upon the above rationale, Kusakabe discloses the features of claim 29.

As per dependent claim 30, Applicant argues Kusakabe does not disclose the input image is a decompressed image....

In response, Kusakabe teaches input of an image, where the image has noise. Kusakabe teaches the noise is an example of image deterioration due to an encoding process or it may be a decoded image suffering block distortion (p. 1, Para 14). Therefore, Kusakabe teaches the input image is a decompressed image as he discloses the input image having noise/deterioration due to decoding.
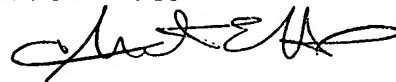
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Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Chante Harrison whose telephone number is 571-272-

7659. The examiner can normally be reached on Monday, Tuesday and Wednesday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Kee Tung can be reached on 571-272-7794. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

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you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Chante Harrison
Examiner
Art Unit 2628

Ch
September 28, 2006